Technology in Practice: Promoting Participation in Patients with High Level Spinal Cord Injury

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Objectives: At the conclusion of this presentation, the learner will be able to:

- Evaluate different modes of technology used to improve participation in daily occupations with individuals with high-level spinal cord injury (SCI)
- Integrate current evidence into clinical practice
- Discuss implications for future practice, research, and education

PICO: Does the use of technology in individuals with cervical and thoracic level spinal cord injuries improve participation in daily occupations?

Methods:

Population	Intervention	Outcome
Cervical SCI, thoracic SCI, tetraplegia, quadriplegia	FES, robotic, OT, eye gaze, hand, grasp, neuroprostheses, technology	Function, participation, social, leisure, work, ADL, occupation, driving, QOL, self-care, activity, upper limb, upper extremity

Search Limitations: English language, human subjects, adolescents and adults, published 2000-2013

Databases Used: PubMed and CINAHL **Total Articles Found: 1,530**

Inclusion Criteria	Exclusion Criteria
- Cervical and thoracic level injuries - Upper extremity interventions - Functional electrical stimulation (FES) - Neuroprostheses - Electronic aids to daily living (EADL) - Functional activity	- Paraplegia - Co-morbid physical disabilities - Only incomplete injuries - Interventions related to mobility - Pediatric populations **Final Article Count Based on Inclusion & Exclusion Criteria: 14**

Qualitative article critical review form: Letts et al., 2007 **Quantitative article critical review form:** Law et al., 1998

Results & Clinical Significance:

Surface FES	- Improved performance in communication management, home management, grooming, and feeding[3,10,11] - Improved performance in leisure participation[3,10] - Research conflicts on ease of home use[3,10]
Implanted FES	- Improved participation in feeding and grooming[7,12,13,14] - Improved participation in communication and home management[7,12,13,15] - Improved performance satisfaction in meaningful activities [7,12,13,14,15]
EADL	- Increased independence in ADLs, leisure participation, and comfort in the home[4,6,16] - Improved perception of self-efficacy, competency, adaptability, and self-esteem[4,16] - Reduced caregiver utilization and/or paid assistance[4,6,8,16]
ASIBOT	- Improved participation in drinking and brushing teeth[17]
Tooth-click technology	- TC provided faster and more reliable clicks than speech recognition - Persons with tetraplegia performed better with TC/OHM than TC/GHM- explanation is unknown[18]

Implications:

Practice	- Implementation of implanted and surface FES in individuals with spinal cord injuries increase participation in ADLs - Use of surface FES, implanted FES, and EADLs increases participation in IADLs
Research	- Higher level of research to support use of technology in rehabilitation - Exploration of additional types of technology - Larger sample sizes for improved generalizability - More research focused on technology for SCI populations - Need for standardized assessments and protocols
Education	- Explore training options to use various types of technology in practice - Provide patient and caregiver education on available technology - Advocate for systematic training protocols for clients using technology

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